

PATENT SPECIFICATION

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(54) AN INFLATOR ADAPTOR

(71) We, THE BLACK AND DECKER MANUFACTURING COMPANY, a Corporation organised under the laws of the State of Maryland, United States of America, of Towson, Maryland 21204, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an inflator adaptor and, more particularly, to a manually controlled hand-held air inflator adaptor for use with air compressors.

Equipment to inflate air inflatable objects, while existing for many years, has become more important within the past several years, especially for the consumer. For example, athletic equipment such as basketballs, footballs, soccer balls, etc., bicycle tires, air mattresses, toys and many other similar inflatable objects, are purchased in a deflated state and require inflation by the consumer. It is also becoming common for consumers to have sources of pressurised air, such as compressors.

The present invention provides an inflator adaptor comprising a body having an inlet port, a bleed port and a discharge port, a first passage extending from the bleed port to the discharge port and a second passage extending from the inlet port and into the first passage, and a resilient flap mounted on the body adjacent to the bleed port and engagable by a digit of the operator's hand gripping the body for selectively closing or throttling the bleed port.

In use, the bleed port is normally open and prevents delivery of more than a nominal pressure to the discharge port. However, when the bleed port is covered, requiring a deliberate but simple manual action, substantially all the pressurised air entering the inlet port is delivered to the discharge port and is available for work.

Advantageously, the second passage tapers away from the inlet port, and the first passage tapers from the discharge port towards the bleed port. The angle of taper of the first passage is, preferably greater than the angle of taper of the second passage. This is because the taper angle of the second passage need only be sufficient to enable the removal of the mould core used in forming this passageway when the body is formed in a one piece moulding, as is described below; whereas the first passage needs to taper sufficiently to enable the bleed port to be manually covered and closed with little difficulty even when full fluid pressure is applied to the inlet port.

Advantageously, the inlet port is formed in an extension of the adaptor body, and the extension, which is preferably cylindrical, is provided with means, for example an external screw thread formed thereon, for the connection of a source of pressurised fluid.

Preferably, the discharge port is provided with means, for example an internally-threaded socket, for the connection of an inflator stem.

The adaptor body may be a one-piece plastics moulding which, preferably, is so shaped as to be hand held. For this purpose, the adaptor body may be provided with a concave finger grippable portion.

This adaptor can be used with a source of pressurised air for the purpose of inflating consumer oriented products safely and with minimal risk of over inflation even by inexperienced users. In addition, this adaptor may be used for general use as a blow gun in maintenance, cleaning and dusting work. The adaptor is safe, inexpensive and easy to use.

One form of inflator adaptor constructed in accordance with the invention will now be described, by way of example, with reference to the accompanying drawings, in which:—

Fig. 1 is a perspective view of the air

inflator adaptor shown in operation:

Fig. 2 is a side elevational view of the adaptor of Fig. 1;

Fig. 3 is a cross-section of the adaptor of Figs. 1 and 2; and

Fig. 4 is a view three inflator stems adapted for use with the adaptor of Figs. 1 to 3.

Referring to the drawings, Fig. 1 shows the adaptor, indicated generally by the reference numeral 10, which comprises a body 12 having an inlet port 14 formed in an extension 15, a bleed port 16 and a discharge port 18. The adaptor body 12 includes passageways providing fluid-flow communication between the inlet port 14 and the bleed and discharge ports 16 and 18. Thus, an inlet passageway 22 formed by a tapered bore extending from the inlet port 14, intersects another tapered bore forming a bleed passageway 19 and a discharge passageway 20. As shown, the bleed passageway 19 terminates in the bleed port 16 while the discharge passageway terminates in the discharge port 18.

The extension 15 is formed with external threads 24 which permits the releasable attachment of a source of pressurised fluid. Fig. 1 illustrates a pressurised fluid line 26 having a female coupling 28 on its end for attachment to the external threads 24 of the extension 15 of the adaptor 10. The pressurised fluid line 26 is connected at its other end to any suitable source of pressurised fluid, such as an air compressor (not shown).

The discharge port 18 is provided with a threaded socket 25 for releasably receiving an inflator stem which communicates with the interior of the object to be inflated. For inflating athletic equipment such as basketballs, volley balls or soccer balls, it is conventional to use an inflator stem such as that shown at 30 in Fig. 4. This inflator 30 comprises a projection 29 having an enlarged externally-threaded end 31 and a passageway running therethrough. For inflating tires, an inflator stem 33 (see Fig. 4) generally includes a valved chuck 35 having a threaded end 38 and is cooperably engageable with a stem provided on the tires. For inflating toys, an inflator stem 41 (see Fig. 4) having a tapered projection 43 having a threaded end 45 may be used. In all cases, the threaded end of the inflator stem 30, 33 or 41 is fitted into the threaded socket 25 in the inflator adaptor 10, while the other end of the inflator stem is fitted into or onto the device to be inflated.

Throughout this specification the term "inflator stem" is used in a general sense to encompass various devices which are used with inflatable objects to provide the fluid-flow connection between the adaptor 10 and the interior of the inflatable objects.

The inflator adaptor body 12 is formed of a single piece of a moulded thermoplastics material such as Nylon. The body 12 is moulded with a pistol grip shape to allow comfortable holding of the adaptor 10 in one hand in such a manner that the user's thumb may be easily placed adjacent a flat surface 34 immediately adjacent the bleed port 16, while a curved recess 36 opposite the surface 34 is shaped to receive one or more of the user's fingers in a comfortable fashion. To facilitate moulding the entire adaptor body 12 as a single piece, the passageway 19, 20 and the passageway 22 are tapered as shown in Fig. 3 and are formed by cores in the moulds which are easily removed because of their tapers.

The passageway 22 has a relatively small degree of taper, generally sufficient to enable the easy removal of the mould core during formation of the body 12. On the other hand, the passageway 19, 20 has a somewhat greater degree of taper, with the smallest cross-section adjacent the bleed port 16. With this construction, the bleed port 16 can be manually covered and closed with little difficulty even when full air pressure is being supplied to the adaptor 10. However, the bleed port 16 is arranged to have a sufficiently large cross-section to allow sufficient air bleed therethrough when the port 16 is open, so that only nominal air pressure can be delivered through the discharge port 18 when the bleed port is open. This serves to control delivery pressure through the discharge port 18 and thereby reduce the possibility of dangerous over inflation of any device with which the adaptor 10 is used.

If desired, a flexible flap 37 constructed of, for example, Vinyl is mounted on the extension 15 and is disposed to be engaged by the user's thumb for covering the bleed port 16.

In use, the adaptor 10 is quickly and easily attached to a source of pressurised fluid, via the air compressor line 26, by threading the compressor coupling 28 onto the threads 24. Depending upon the object to be inflated, the desired stem is releasably inserted in the discharge port 18, by threadably engaging it with the threaded socket 25. The adaptor 10 is then ready for use.

Assuming that ball 32 is being inflated, the stem 29 of the inflator 30 is inserted into a self-sealing valve provided in the ball and the compressor is actuated. Air enters the adaptor inlet port 14 and passes through the passageway 22. If the air pressure within the ball 32 is greater than atmospheric pressure, the air will flow through the passageway 20 and cut through the bleed port 16, provided nothing obstructs the bleed port 16. Little or no air will discharge through the port 18. In order to inflate the ball, the user, exercising

a deliberate act, places his thumb directly over the bleed port 16, or (where the flap 37 is provided) presses the flap to cover the port 16 thereby forcing the air to flow through the discharge port 18, the stem 30 and into the ball 32. By selectively covering, uncovering or partially covering the bleed port 16, the user can easily control the extent to which the ball 32 is inflated. As soon as the ball 32 is fully inflated the user merely removes the obstruction from the bleed port 16, and since the pressure within the ball is greater than atmospheric pressure, the air entering the passageway 22 will flow out through the bleed port 16. The adaptor 10 is then retracted from the ball 32 effecting removal of the stem 29 from the self-sealing valve.

It will be apparent that the adaptor described above is inexpensive to manufacture, easy to use and is small and may be comfortably held in one hand. Moreover, this adaptor reduces the possibility of over-inflation of toys, balls, etc., especially by children, in that it requires a deliberate action, that is to say the covering of the bleed port, in order for inflation to occur. This renders the adaptor considerably safe in use and renders it inoperative when the user's hand is not in place thereon.

WHAT WE CLAIM IS:—

1. An inflator adaptor comprising a body having an inlet port, a bleed port and a discharge port, a first passage extending from the bleed port to the discharge port and a second passage extending from the inlet port and into the first passage, and a resilient flap mounted on the body adjacent to the bleed port and engageable by a digit of the operator's hand gripping the body for selectively closing or throttling the bleed port.

2. An inflator adaptor as claimed in claim 1, wherein a flat external surface of the body encompasses the bleed port.

3. An inflator adaptor as claimed in claim 1 or claim 2, wherein the second passage tapers away from the inlet port.

4. An inflator adaptor as claimed in any one of claims 1 to 3, wherein the first passage tapers from the discharge port towards the bleed port.

5. An inflator adaptor as claimed in claim 4, wherein the angle of taper of the first passage is greater than the angle of taper of the second passage.

6. An inflator adaptor as claimed in any one of claims 1 to 5, wherein the inlet port is formed in an extension of the adaptor body.

7. An inflator adaptor as claimed in claim 6, wherein the extension is provided with means for the connection of a source of pressurised fluid.

8. An inflator adaptor as claimed in claim 7, wherein the extension is a cylindrical projection and said means is constituted by an external screw thread formed thereon.

9. An inflator adaptor as claimed in any one of claims 1 to 8, wherein the discharge port is provided with means for the connection of an inflator stem as hereinbefore defined.

10. An inflator adaptor as claimed in claim 9, wherein the discharge port defines an internally-threaded socket which constitutes the means for the connection of an inflator stem.

11. An inflator adaptor as claimed in any one of claims 1 to 10, wherein the adaptor body is a one-piece plastics moulding.

12. An inflator adaptor as claimed in any one of claims 1 to 11, wherein the adaptor body is so shaped as to be hand held.

13. An inflator adaptor as claimed in claim 12, wherein the adaptor body is provided with a concave finger grippable portion.

14. An inflator adaptor substantially as hereinbefore described with reference to, and as shown in, Figs. 1 to 3 of the accompanying drawings.

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